

Serial No. 09/973,685

Page 2

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (previously presented) An electric motor control system comprising:  
a stator for producing a magnetic field;  
a surface mount permanent magnet rotor rotated by said magnetic field;  
a motor shaft coupled to said rotor;  
power electronics for controlling said magnetic field in said stator;  
wherein said power electronics controls the q-axis and d-axis current components for the electric motor; and  
a controller controlling said power electronics, said controller including a control block to control the d-axis current as a function of the angle  $\beta$  when said permanent magnet rotor is in magnetic saturation.
2. (original) The electric motor control system of Claim 1 wherein said stator includes current carrying coils to generate said magnetic field.
3. (original) The electric motor control system of Claim 1 wherein said surface mount permanent magnet rotor includes rare earth magnets.
4. (original) The electric motor control system of Claim 1 wherein said power electronics comprises a voltage source inverter.
5. (currently amended) The electric motor control system of Claim 1 wherein said permanent magnetic rotor exhibits non-linear behavior when said d-axis current is controlled as a function of the angle  $\beta$ .
6. (currently amended) A method of controlling an electric motor comprising:

Serial No. 09/973,685

Page 3

providing an electric motor having a wound stator, a rotor magnetically coupled to said wound stator, said rotor including surface mount permanent magnets;  
controlling q-axis current in the stator;  
controlling d-axis current in the stator;  
magnetically saturating the rotor; and  
wherein the step of controlling the q-axis current in the stator comprises controlling the q-axis current as a function of the angle  $\beta$ .

7. (cancelled)

8. (original) The method of Claim 6 wherein the step of controlling the d-axis current in the stator comprises controlling the d-axis current as a function of the angle  $\beta$ .

9. (original) The method of Claim 6 further comprising the step of controlling the position of the electric motor.

10. (currently amended) A method of controlling an electric motor comprising:  
providing an electric motor having a wound stator, a rotor magnetically coupled to said wound stator, said rotor including surface mount permanent magnets;  
providing a vector controller and voltage switched inverter to provide stator current to the wound stator;  
controlling the q-axis and d-axis current components of the stator current to control the torque of the electric motor and saturate the rotor magnetically; and  
calculating the d-axis current setpoint as a function of the angle of the stator current vector with reference to the q-axis.

11. (original) The method of Claim 10 further comprising the step of determining the position of said rotor.

Serial No. 09/973,685

Page 4

12. (original) The method of Claim 11 further comprising the step of determining the actual current of the electric motor.

13. (cancelled)